

Evaluation of surge irrigation on productivity, land equivalent ratio and economics of cassava + groundnut comrade cropping system

S. RAJESH¹, S. RAMESH^{1*} AND B. CHANDRASEKARAN²

¹Department of Agronomy, Tamil Nadu Agricultural University, COIMBATORE (T.N) INDIA

²Directorate of Research, Tamil Nadu Agricultural University, COIMBATORE (T.N) INDIA

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SUMMARY

Field experiments were conducted at Eastern Block, Tamil Nadu Agricultural University, Coimbatore during 2002-03 and 2003-04 to study the influence of irrigation methods viz., Continuous irrigation (I₁) and Surge irrigation (I₂), Cropping system viz., Pure cassava (C₁), Cassava + Groundnut (C₂), Pure Groundnut (C₃) and Sectors viz., 0 to 25m (S₁), 26 to 50m (S₂), 51 to 75m (S₃) and 76 to 100m (S₄) on the productivity, land equivalent ratio and economics of Cassava + Groundnut comrade cropping system. The treatments were replicated thrice in a factorial randomized block design. The results revealed that, there was no significant difference among the irrigation methods with respect to all growth parameters, yield attributes, tuber yield of cassava and pod and haulm yield of groundnut. Significantly, higher values of growth, yield parameters and yield were registered in pure cassava and pure groundnut cropping system over Cassava + Groundnut comrade cropping system. Among the different Sectors, sector 1 (0-25 m) produced higher values of growth, yield parameters, tuber yield of cassava, pod and haulm yield of groundnut than sector 3 and it was comparable to sector 2 and sector 4. Land Equivalent ratio (LER) was significantly influenced by comrade cropping. Raising Cassava + Groundnut (C₂) comrade cropping registered higher LER in both the years. Higher net return with high Benefit: Cost ratio was realized under surge flow with cassava + Groundnut system due to enhanced productivity.

Key words : Surge irrigation, Growth, Yield, Cassava + Groundnut system.

Cassava (*Manihot esculenta* crantz.) commonly known as tapioca in India is subsidiary food for more than 300 million people in as many as 90 countries. India tops in productivity with 24.5 t ha⁻¹ and Tamil Nadu accounts for 32 per cent area under cassava in India. Higher biological efficiency and highest rate of dry matter production per day per unit area was realized by cassava among all the crops (Edison, 2004). Water is the precious input under all situations of farming, more specifically under irrigated drylands referred as garden lands in Tamil Nadu. In Tamil Nadu, wells are the only source of water supply commanding nearly 1.3 million ha. The detrimental water tapping, which led to drying of wells have to be tackled by proper crop selection and water management techniques. As such water saving is the pivotal issue to be addressed to stabilize the crop yield. Cassava is relatively a drought tolerant, wide spaced crop with slow initial establishment and canopy coverage, thus providing ample scope for raising groundnut as intercrop with Cassava in Tamil Nadu. Comrade cropping refers to “culture of two crops in which the population of both components account for 100 per cent and equal to their respective population”. Worldwide, surface irrigation is the most common method of applying water to crops accounting more than 95 per cent of irrigated land (250 m.ha) (Kay, 1990). Among the surface irrigation methods,

Surge irrigation is the possible alternative for basin furrow method of irrigation. “Surge irrigation is the delivery of water into the long furrows in an “ON” and “OF” fashion relatively over a short spans of time and reduces infiltration rates as a result of which water front advance along the furrow is quickened”. Detailed studies using surge irrigation in maize (Dhanapal, 1996), Sunflower (Sathyamoorthy, 1997) and Sorghum (Solaimalai, 1999) showed that sector 1(0-25m) registered higher grain and stover yield which gradually reduced upto sector 3 (51-75m) and again increased in the last sector (75-100m). This decrease in growth and yield of crop has been termed as ‘Penultimate depression’ (Rajagopal and Dhanapal, 1997). There is a need to overcome this problem. Penultimate depression in this sector (51-75m) was overcome through placing the hydrophilic weir using coconut epicarp at 50th and 75th sector with 5cm and 7.5cm width, respectively. Hence, the present study was formulated to explore the influence of surge irrigation on the productivity, LER and Economics of Cassava + Groundnut comrade cropping system.

MATERIALS AND METHODS

Field experiments were conducted to study the effect of surge irrigation on the productivity and economics of Cassava + Groundnut comrade cropping system at

* Author for correspondence.